

Claims:

1. A method for transmitting information using ultra-wide band transmission, the method comprising:

allocating, for signal transmission, each of a plurality of frequency sub-bands; and

5 sending an ultra-wide band transmission comprising the information by

transmitting a signal over each of the plurality of frequency sub-bands; and

allowing variation of at least one transmission parameter to facilitate trade-off

between at least two of power consumption, energy collection, bit rate, performance, range,

resistance to multiple access interference, and resistance to multipath interference and spectral

10 flatness.

2. The method of claim 1, comprising allowing variation of pulse repetition frequency.

15 3. The method of claim 1, wherein sending an ultra-wide band transmission comprises sending a burst symbol cycle transmission.

4. The method of claim 1, comprising sending a burst symbol cycle signal over each of the frequency sub-bands.

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5. The method of claim 4, wherein sending an ultra-wide band transmission comprises sending a burst symbol cycle transmission.

6. The method of claim 1, comprising allowing variation of at least one transmission parameter in order to adapt to varying application requirements.

7. The method of claim 6, comprising automatically varying at least one 5 transmission parameter in order to adapt to at least one of varying application requirements and environment requirements.

8. The method of claim 6, comprising using one or more algorithms to facilitate 10 varying at least one transmission parameter in order to adapt to at least one of varying application requirements and environment requirements.

9. The method of claim 1, wherein sending an ultra-wide band transmission comprises using orthogonal frequency division multiplexing, and comprises using at least one of cyclic prefix transmission, zero padding, and a combination of cyclic prefix transmission and 15 zero padding.

10. The method of claim 1, comprising allowing variation in time spreading, while sending identical information multiple times in a single sub-band as well as in different sub-bands.

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11. A method for receiving information using ultra-wide band transmission, the method comprising:

allocating, for signal transmission, each of a plurality of frequency sub-bands; and

receiving an ultra-wide band transmission comprising the information by receiving signals transmitted over each of the plurality of frequency sub-bands; and allowing variation of at least one of one or more reception parameters to facilitate trade-off between at least two of power consumption, energy collection, bit rate, performance, 5 range, resistance to multiple access interference, and resistance to multipath interference and spectral flatness.

12. The method of claim 11, comprising allowing variation of received pulse repetition frequency.

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13. The method of claim 12, comprising reducing power consumption by shutting off the receiver at least one of during off periods, during anticipated redundant symbols, and during anticipated noisy symbols.

15 14. The method of claim 11, comprising varying an ADC bit number based on variation in at least one of an application and environmental requirements.

15. The method of claim 11, wherein receiving an ultra-wide band transmission comprises receiving a burst symbol cycle transmission.

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16. The method of claim 11, comprising receiving burst symbol cycle signals over each of the frequency sub-bands.

17. The method of claim 16, wherein receiving an ultra-wide band transmission comprises receiving a burst symbol cycle transmission.

18. A method for communicating information using ultra-wide band transmission and reception, the method comprising:

- allocating, for signal transmission, each of a plurality of frequency sub-bands;
- sending an ultra-wide band transmission comprising the information by transmitting a signal over each of the plurality of frequency sub-bands;
- receiving an ultra-wide band transmission comprising the information by

10 receiving signals transmitted over each of the plurality of frequency sub-bands; and

- allowing variation of at least one of one or more transmission parameters and one or more reception parameters to facilitate trade-off between at least two of power consumption, energy collection, bit rate, performance, range, resistance to multiple access interference, and resistance to multipath interference and spectral flatness.

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19. A method for transmitting information using ultra-wide band transmission, the method comprising:

- allocating, for signal transmission, each of a plurality of frequency sub-bands; and
- sending an ultra-wide band transmission comprising the information by

20 transmitting a signal over each of the plurality of frequency sub-bands; and

- setting at least one transmission parameter to facilitate a desired trade-off between at least two of power consumption, energy collection, bit rate, performance, range, resistance to multiple access interference, and resistance to multipath interference and spectral flatness.

20. The method of claim 19, comprising setting pulse repetition frequency.

21. A method for transmitting information using ultra-wide band transmission, the
5 method comprising:

allocating, for signal transmission, each of a plurality of frequency sub-bands; and
sending an ultra-wide band transmission comprising the information by
transmitting a signal over each of the plurality of frequency sub-bands; and
varying pulse repetition frequency to facilitate trade-off between at least two of

10 power consumption, energy collection, bit rate, performance, range, resistance to multiple access
interference, and resistance to multipath interference and spectral flatness.

22. The method of claim 21, wherein varying pulse repetition frequency comprises
varying of spacing of frequencies in a sequence.

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23. The method of claim 21, wherein varying pulse repetition frequency comprises
replacing selected frequencies in a sequence with off periods.

24. The method of claim 21, wherein pulse repetition frequency is varied according to
20 at least one of a particular application and a particular environment.

25. The method of claim 21, comprising adaptively varying pulse repetition frequency according to at least one of varying application requirements and varying environmental requirements.

5 26. The method of claim 21, comprising adaptively varying pulse repetition frequency using one or more algorithms.

27. The method of claim 21, comprising adaptively varying pulse repetition frequency

10 28. The method of claim 21, comprising reducing pulse repetition frequency to increase filter selectivity.

29. The method of claim 27, wherein reducing pulse repetition frequency to increase

15 notch filter selectivity allows a chip implementation of one or more filters.

30. The method of claim 21, comprising varying pulse repetition frequency of pulse transmission.

20 31. The method of claim 21, comprising varying pulse repetition frequency of OFDM transmission.

32. The method of claim 31, comprising varying pulse repetition frequency to reduce cross-band interference.

33. The method of claim 21, comprising reducing pulse repetition frequency to mitigate interference between two or more pico-nets that each use a different frequency hopping sequence.

34. The method of claim 33, comprising reducing pulse repetition frequency by removing selected frequencies in a sequence and replacing them with off periods.

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35. The method of claim 34, comprising reducing pulse repetition frequency by a factor of two by removing one out of every two consecutive frequencies.

36. The method of claim 34, comprising reducing pulse repetition frequency by a factor of three by removing one out of every three consecutive frequencies.

37. The method of claim 21, comprising using different frequency hopping sequences for each of multiple pico-nets.

20 38. A method for transmitting information using ultra-wide band transmission, the method comprising:

allocating, for signal transmission, each of a plurality of frequency sub-bands; and

sending an ultra-wide band transmission comprising the information by transmitting a signal over each of the plurality of frequency sub-bands; and setting pulse repetition frequency to mitigate inter-symbol interference.

5 39. A method for transmitting information using ultra-wide band transmission, the method comprising:

allocating, for signal transmission, each of a plurality of frequency sub-bands; and sending an ultra-wide band transmission comprising the information by transmitting a signal over each of the plurality of frequency sub-bands; and allowing variation of pulse repetition frequency to facilitate trade-off between at least two of power consumption, energy collection, bit rate, performance, range, and resistance to multipath interference and spectral flatness.

10 40. A system for communicating information using ultra-wide band transmission and reception, the system comprising:

a transmitter for:
 sending an ultra-wide band transmission comprising the information by transmitting a signal over each of a plurality of frequency sub-bands; and
a receiver for:
 receiving an ultra-wide band transmission comprising the information by receiving signals transmitted over each of a plurality of frequency sub-bands;
 wherein the system allows for at least one of selection of and variation of at least one of one or more transmission parameters and one or more reception parameters to provide adaptive

trade-off between at least two of power consumption, bit rate, performance, range, and resistance to multipath interference and spectral flatness.